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**U.S. Army
Environmental
Center**

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**REPORT ADDENDUM
ENVIRONMENTAL INVESTIGATION, RISK ASSESSMENT
AND ALTERNATIVES ANALYSIS
FORT DES MOINES
DES MOINES, IOWA**

SUBMITTED TO:

**U.S. ARMY ENVIRONMENTAL CENTER
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1.0 PURPOSE

In 1988, Congress passed the Defense Authorization Amendment and Base Closure and Realignment Act. This legislature mandated the closure or realignment of selected military bases to economically maximize military operations. As a result, in 1988, a total of 111 military installations were recommended for either closure or realignment by the Base Realignment and Closure Commission. One of the installations slated for closure was the current Fort Des Moines (FDM), which encompasses 53.3 acres.

Because base closures and realignments must comply with applicable state and federal environmental laws, a series of environmental investigations were undertaken at FDM under the auspices of the U.S. Army. This resulted in the production of a number of reports and related documents for the recent environmental studies performed at the current FDM. The U.S. Army realized that there was the need for a document that would relate the various study documents, prepared under the direction of different branches of the Army, to one another. Therefore, the purpose of this addendum is to relate the recent developments at FDM and to bridge the different studies, providing the reader a better understanding of the events related to FDM.

2.0 PROJECT BACKGROUND AND HISTORY

A series of environmental investigations have been ongoing at the current FDM since 1988. The United States Army Environmental Center (USAEC), formerly the United States Army Toxic and Hazardous Materials Agency (USATHAMA), in 1990 initiated an Environmental Investigation (EI), a Risk Assessment (RA), and an Alternatives Analysis (AA) at the current FDM facility. The purpose of this EI/RA/AA was to identify existing and potential environmental contamination at the site, assess the human health and environmental risks, and evaluate remedial alternatives to allow for the imminent closure and potential transfer or sale of the property. It was not the purpose of the EI/RA/AA study to recommend a particular remedial alternative. Rather, the ten remedial alternatives that were developed in the AA formed a set of feasible options from which the ultimate site remedial alternative could be selected. Of these ten alternatives, five were retained in the AA for further consideration.

The EI portion of the aforementioned study at FDM, which was carried out as four phases from early 1991 to early 1993, identified 12 areas of environmental concern, each of which are discussed in detail in the EI/RA/AA report. One of the more significant areas of concern was the pesticide blending operations that took place around Building 138. The resultant Draft EI/RA/AA report underwent internal Army review in 1993, with a draft final report produced in December 1993.

3.0 REGULATORY REVIEW OF THE EI/RA/AA REPORT

The USAEC's contractor, Versar, Inc., submitted the Draft Final EI/RA/AA report for the environmental investigation at FDM in December of 1993. The Army then solicited regulatory agency (Iowa Department of Natural Resources and U.S. EPA, Region VII) review of the technical report in January 1994. The process of responding to regulatory comments delayed the completion of the final report, as a number of iterations of the responses to comments were made. The resolution of the response to regulatory comments was completed in June 1995. The regulatory review comments and associated Army responses are contained as Appendix G of the Final EI/RA/AA report.

4.0 FINDINGS SUBSEQUENT TO THE EI/RA/AA/REPORT

4.1 Background on Building 138

The most environmentally significant tenant operation during the history of FDM was the leasing of Buildings 67 and 138 to the Barco Chemical Company for pesticide blending operations between 1950 and 1959. Both of these buildings were located near the western boundary of the current FDM, by Blank Park. Building 67 has since been demolished and was located on a parcel that has been transferred to Polk County ownership. Building 138, which is part of the current FDM, is currently boarded up and locked to minimize access.

Building 138 is a masonry and wood structure constructed in 1905, and it is one of the buildings considered to be contributing historical value to FDM. The building was a former quartermaster warehouse located on the southwestern corner of the current FDM property and was leased to Barco Chemical Company (Barco) from 1950 through 1959. At that time, the building was used for the formulation (i.e., mixing) and bagging of organochlorine pesticides. During the performance of the EI, several types of samples were collected in and around Building 138 to evaluate the types and extent of chemical contamination that could pose potential hazards for future use scenarios and their subsequent effect. The EI determined that the building was heavily contaminated with various pesticides/herbicides and associated byproducts, the most predominant of which was DDT. Pesticides/herbicides were also detected in the soil adjacent to Building 138 and in the sediments found in a buried storm sewer that is located between Building 138 and former Building 67. Ambient air samples, collected from within the building, however, did not indicate a severe air contamination problem, and overall conditions were considered to be not readily conducive for the generation of pesticide vapors.

The results of the EI indicated that pesticides, which were prevalent during use of the building by Barco Chemicals, are still residually present at significant concentrations within

Building 138's interior. Because dioxin was assumed to be present in the building, the RA showed that the building could not be re-inhabited. The only presumed effective remedial alternative for cleaning up the building was to decontaminate the building's interior, then demolish the structure and dispose of the construction debris off site at a RCRA hazardous waste facility.

4.2 Follow-up Army Investigation at Building 138

Based on the pesticide data contained in the EI/RA/AA report and the possibility that potentially significant levels of dioxin could be present in Building 138, the Army considered the building as potentially being an imminent danger to the environment (even considering the existing access restrictions). Working with the assumption formulated by the EI sampling data, the U.S. Army Corps of Engineers (Omaha District) utilized their rapid response contractor, OHM Remediation Services, Corporation, to perform detailed sampling in and around Building 138 in mid-1994. The results of this follow-up study, as detailed in the Omaha District's "Action Memorandum for Fort Des Moines, Iowa", dated July 7, 1995, mostly substantiated chemical data collected during the EI, but came to the conclusion that the "suspected" dioxin contamination did not exist. Based on the Omaha District's findings, the Army, because of the potential historical significance of the building, revised their intentions for Building 138 to allow for the potential reuse of the building after proper decontamination (steam cleaning and power washing) of the interior.

5.0 SELECTION OF CLEANUP ALTERNATIVE

The Alternatives Analysis (AA) presented the rationale for identifying, evaluating, and selecting appropriate cleanup response actions for the identified areas of concern at FDM. The areas of concern at FDM were grouped into three different categories: (1) those that had only one feasible remedial alternative; (2) those dealing with building-specific issues (asbestos, radon, and lead-based paint); and (3) those that were groundwater-related. Based on these three categories, ten remedial alternatives were developed, compared to one another, and evaluated according to the nine EPA Superfund evaluation criteria. In the EI/RA/AA Report, five alternatives were retained initially for further consideration and were presented for regulatory and Army review. No one particular cleanup alternative was chosen over the other in the AA.

During the regulatory review period, none of the five retained alternatives were selected as the "preferred" alternative. The Army, utilizing the information presented by the Omaha District, chose preferred options for each of the three categories. These options are described below:

Category 1. For these environmental concerns, which are areas of concern (such as underground storage tanks, PCB transformers, Building 138, etc.) with only one recommended cleanup solution, the Army prefers to perform complete remediation.

Category 2. For building-specific issues regarding asbestos, radon, and lead-based paint, the Army has chosen the "No Action" alternative. This alternative was selected because no final decision has been made regarding the future use of the buildings on site and these concerns can be adequately addressed by: (1) continuing to prevent access to the buildings (if the buildings are retained by the Army); or (2) by full disclosure of the concerns prior to deed transfer (if the buildings are sold). Since all but two of the buildings are currently uninhabited, there are no current human exposures or health risks associated with the buildings.

Category 3. For dealing with contaminated groundwater issues, the Army's preferred alternative involves source removal in conjunction with a long-term groundwater monitoring program. This approach is considered to be the most viable option for the cleanup of the affected groundwater at FDM for a number of reasons, each of which is discussed below.

1. **Effectiveness of Pump and Treat Systems** - The effectiveness of such cleanup systems is greatly dependent on how readily groundwater moves through an affected aquifer and how readily it can be pulled out of recovery wells. The easier the groundwater flows through an aquifer and out through recovery wells, the greater the opportunity for contaminants to be flushed out of the affected aquifer. As would be expected, pump and treat systems in aquifers with good hydrogeologic characteristics (i.e., high transmissivity and good well yield capacity) have a greater chance of success in effectively removing contaminants from the substrate than a aquifer with corresponding low values. Conversely, aquifers with low transmissivity and well yield values have a greater potential for contaminants to remain within the substrate and not readily being released to surrounding migrating groundwater. Based on data from the hydrogeologic tests performed during the EI and in available Iowa geological literature, the shallow substrate underlying FDM predominantly consists of glacial till that has low well yield capabilities. A groundwater pump and treat alternative, therefore, would have low likelihood of success.
2. **Current Shallow Groundwater Use Restrictions** - Currently, there is an ordinance that prohibits using the shallow groundwater in Polk County as a drinking water supply when municipal sources are readily available. Based on the proximity of local development (e.g., apartment houses, etc.) to the study area, such a municipal supply would be readily available to future users of the property. The groundwater use restrictions were based on two concerns: that the shallow aquifer had become

contaminated locally by agricultural activities (e.g., from nitrates and pesticides), and that the shallow water table could easily be overdrawn by too many wells pumping in an aquifer with low yield. Such groundwater use restriction effectively minimizes the potential for direct human exposures to the affected groundwater.

3. Removal of Contaminant Source - All of the alternatives retained for consideration call for the removal of the on-site contaminated soils ("hot spot") by Building 138 and associated with the storm sewer line between Buildings 67 and 138. Since contaminants migrating through the subsurface are affected by a variety of biological, physical, and chemical activities, source removal, along with the natural process of attenuation, which would reduce overall contaminant concentrations in groundwater over time. This would be enhanced by allowing future infiltrating and migrating groundwater in the remediated areas to flow through clean replacement fill. The most recent version of U.S. EPA's Risk-Based Concentration Tables could be the chosen to determine necessary soil cleanup levels (residential uses) for Army response actions.
4. Groundwater Monitoring Program - The proposed monitoring program will be designed to monitor the effectiveness of the source removal and track the progress of natural attenuation of the groundwater contaminants. If, during the course of the monitoring program, it is determined that there is little or no attenuation of the groundwater contaminants, the Army will re-evaluate the need for extracting and treating the groundwater in the shallow aquifer.

The Army's chosen remedial options for each of these categories, while components of different retained alternatives, required that one of the original alternatives, which was not retained in the AA, be re-introduced. This alternative (number 3) contains the same options for Category 1 and 2 as Alternative 4, and the same Category 3 option as Alternative 6. The Army feels that this alternative is the most cost effective solution to the environmental concerns at FDM.

6.0 SUMMARY

The recent environmental studies undertaken at FDM are now complete. The EI portion of the EI/RA/AA report defined several areas of existing and potential environmental concerns, in particular, the pesticide handling activities centered around Building 138. The Risk Assessment (RA) evaluated the current and potential health and environmental problems that could result if the identified areas of concern were not addressed. The Alternative Analysis (AA) proposed ten potentially applicable cleanup scenarios (including the demolition of Building 138) for addressing the identified areas of concern.